SNS COLLEGE OF ENGINEERING

Kurumbapalayam (Po), Coimbatore – 641 107

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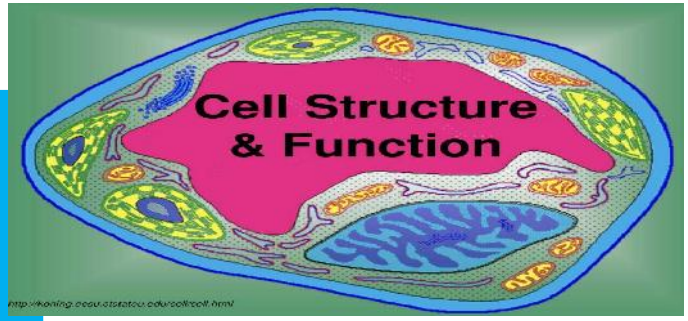
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING



Subject Code: 19BY701

Subject: Biology for Engineers

Unit-I

Topic: Cell Theory

Cell Theory

- All living things are made up of cells.
- Cells are the smallest working units of all living things.
- All cells come from preexisting cells through cell division.

Definition of Cell

A cell is the smallest unit that is capable of performing life functions.

Examples of Cells

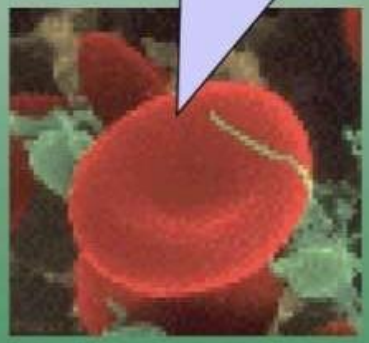
Amoeba Proteus

Plant Stem

Bacteria

Nerve Cell

Red Blood Cell

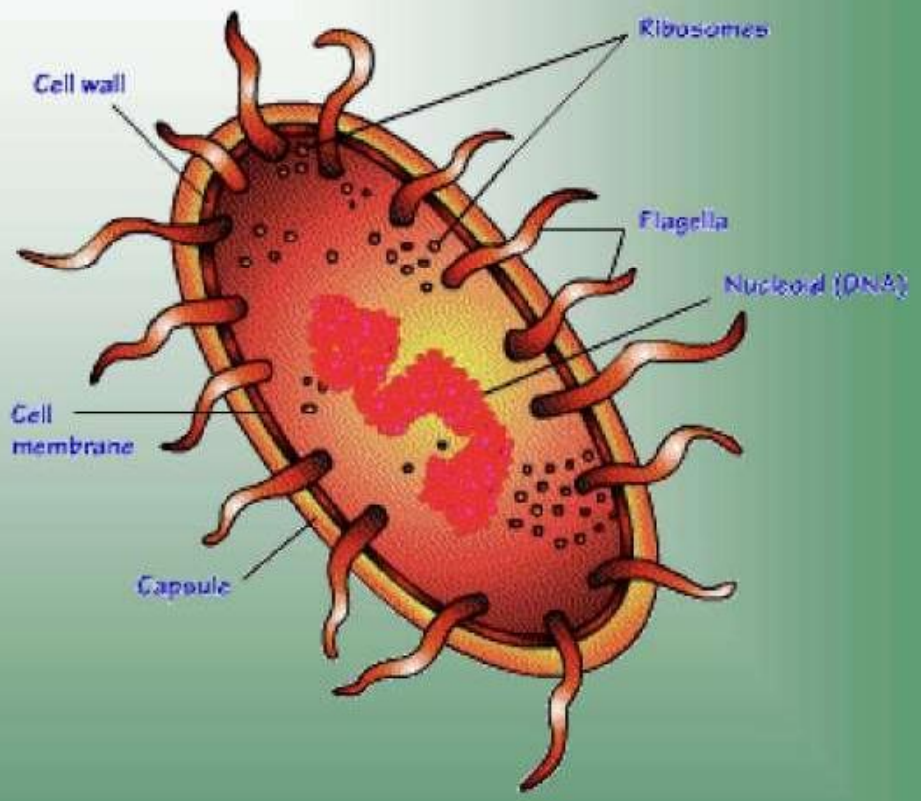


Two Types of Cells

- Prokaryotic
- Eukaryotic

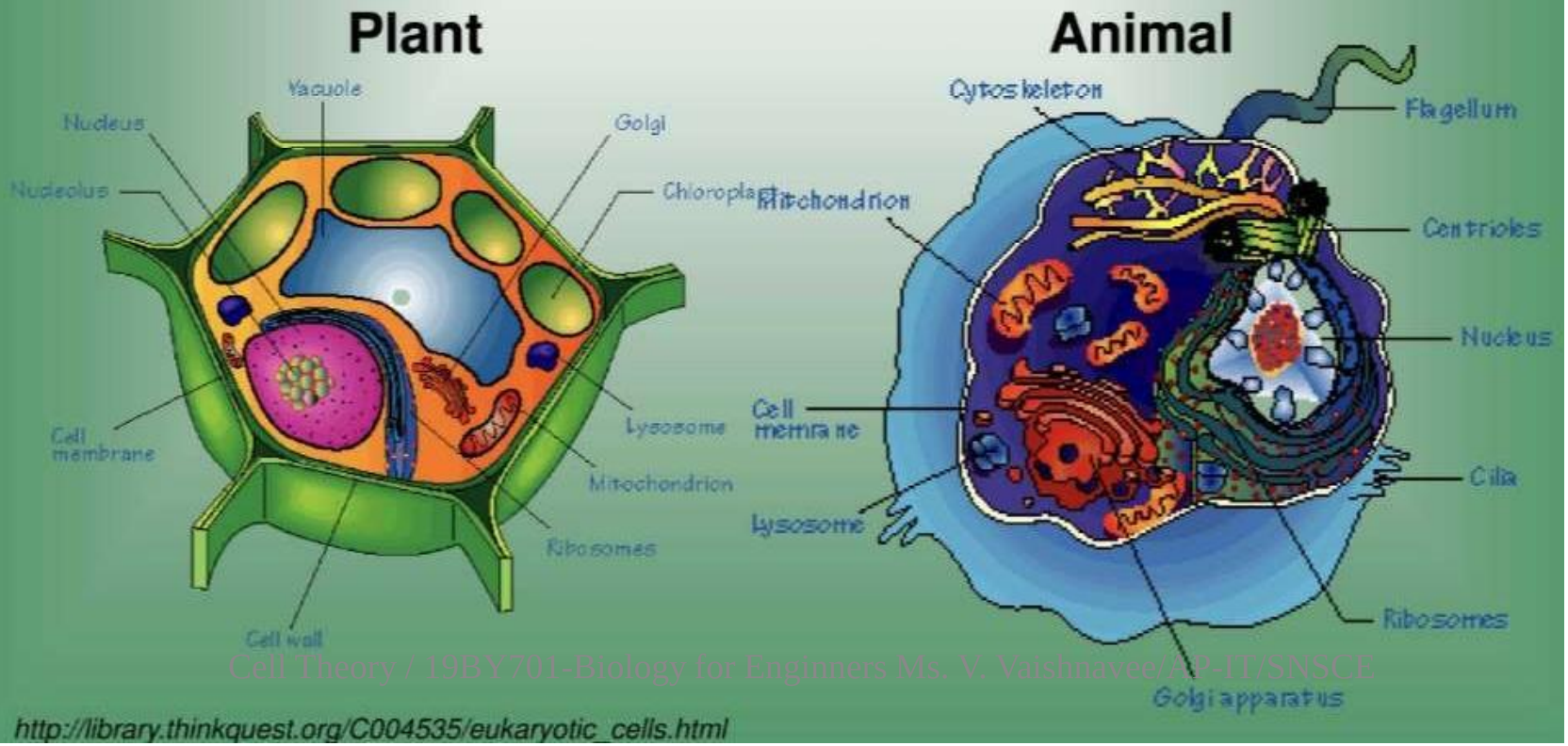
Prokaryotic

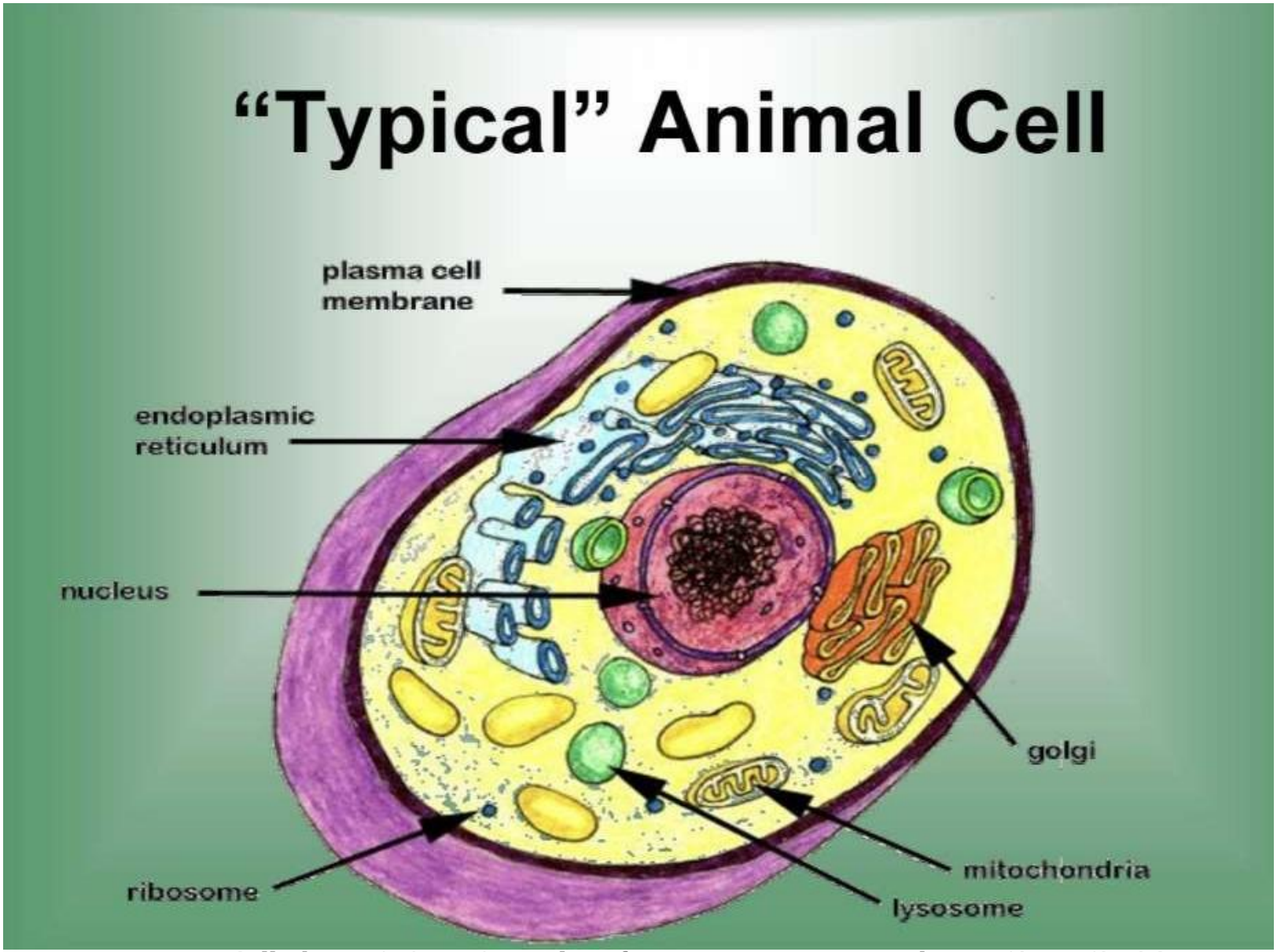
- Do not have structures surrounded by membranes
- Few internal structures
- One-celled organisms, Bacteria

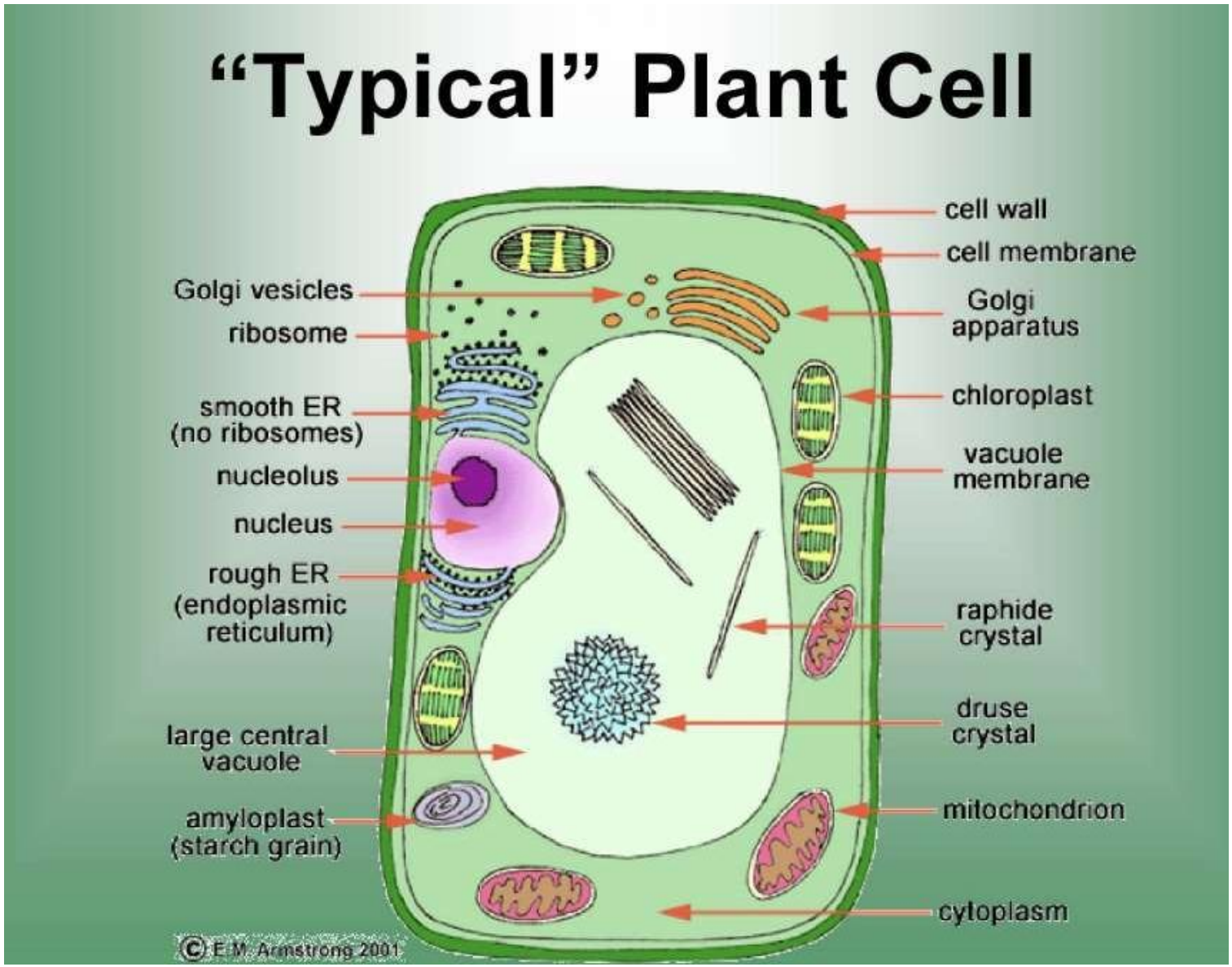


Eukaryotic

- Contain *organelles* surrounded by membranes
- Most living organisms




"Typical" Animal Cell
plasma cell membrane
endoplasmic reticulum
nucleus
golgi
mitochondria
lysosome
ribosome


"Typical" Plant Cell
cell wall
cell membrane
Golgi vesicles
Golgi apparatus
ribosome
chloroplast
smooth ER (no ribosomes)
vacuole membrane
nucleolus
nucleus
rough ER (endoplasmic reticulum)
raphide crystal
druse crystal
large central vacuole
mitochondrion
amyloplast (starch grain)
cytoplasm
© E.M. Armstrong 2001

Cell Parts

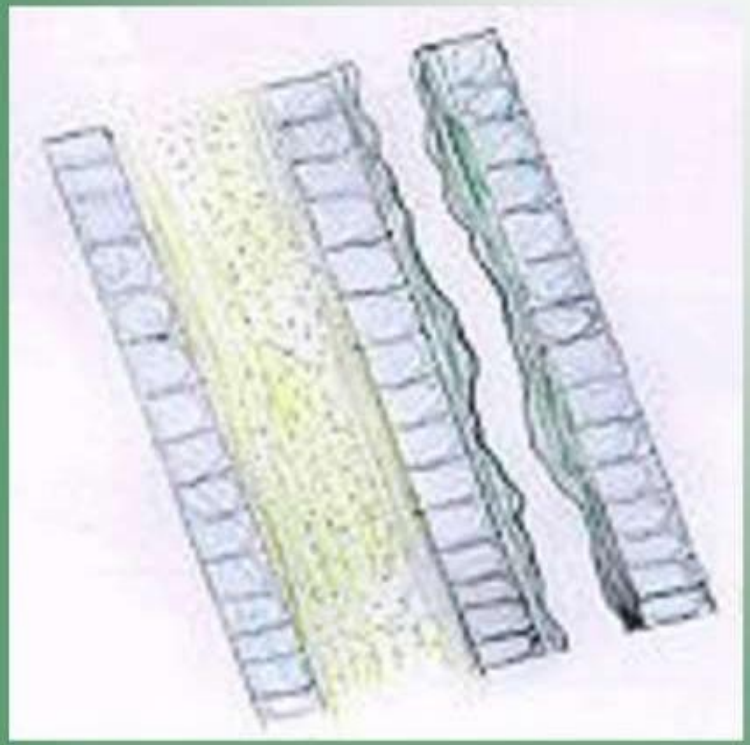
Organelles

Surrounding the Cell

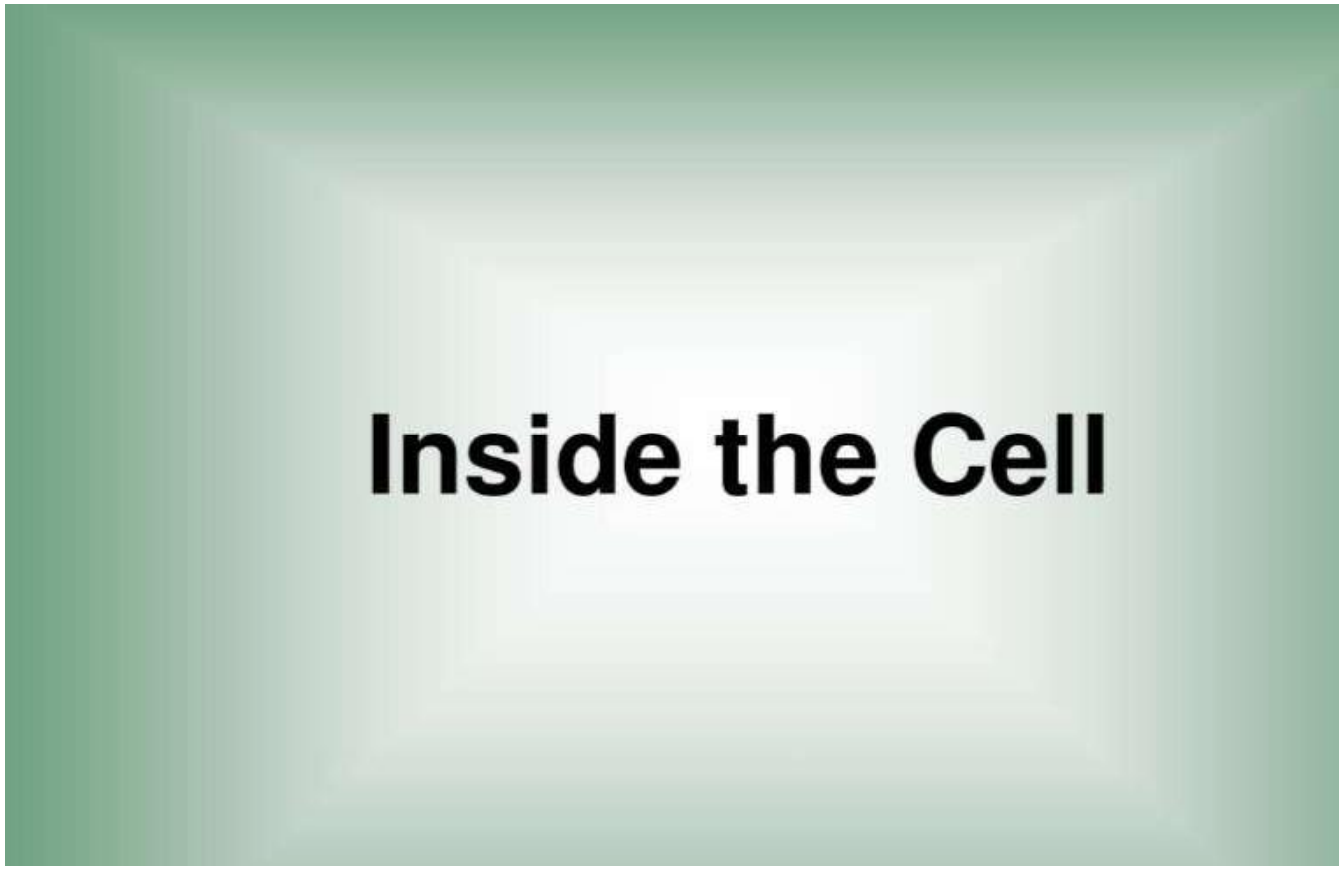
Cell Membrane

- Outer membrane of cell that controls movement in and out of the cell
- Double layer

Cell Wall



- Most commonly found in plant cells & bacteria
- Supports & protects cells

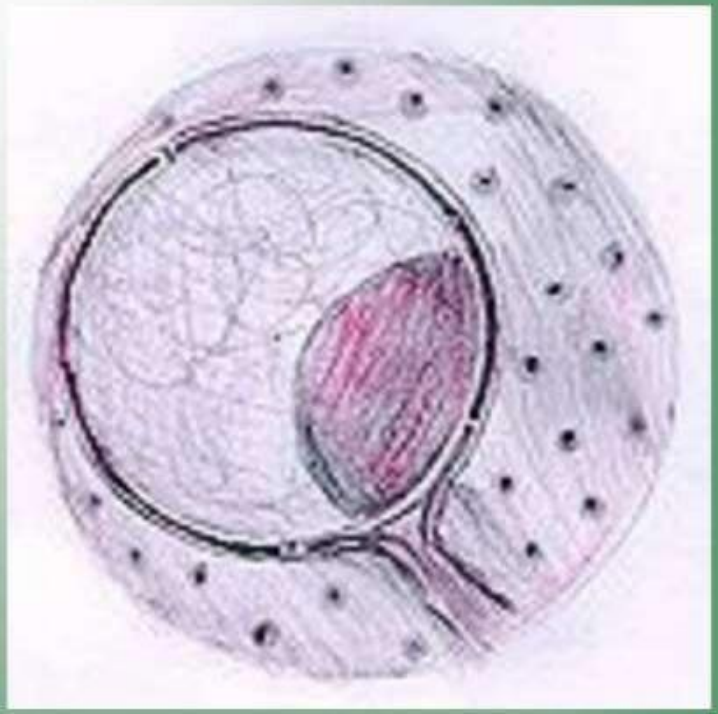

Inside the Cell

Nucleus

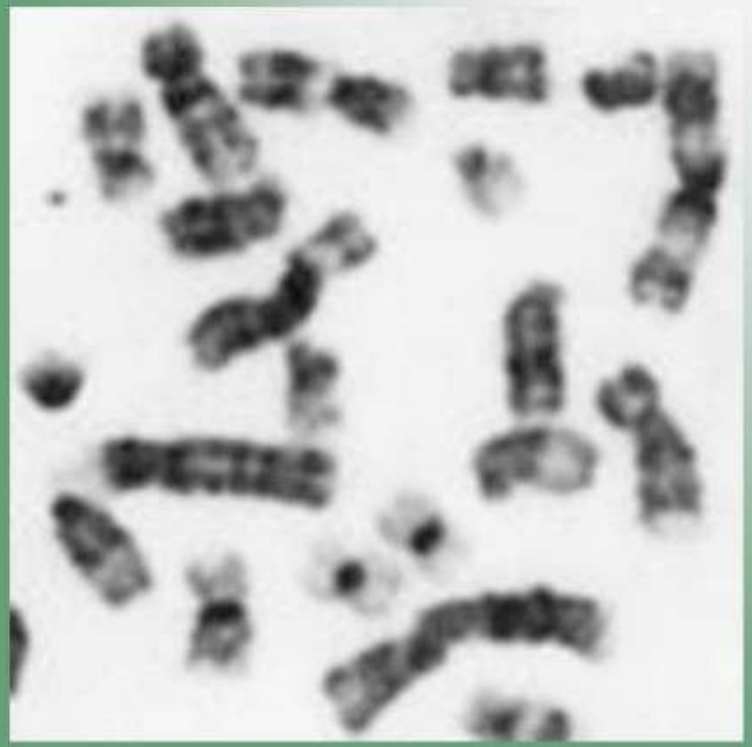
- Directs cell activities
- Separated from cytoplasm by nuclear membrane
- Contains genetic material - DNA

Nuclear Membrane

- Surrounds nucleus
- Made of two layers
- Openings allow material to enter and leave nucleus



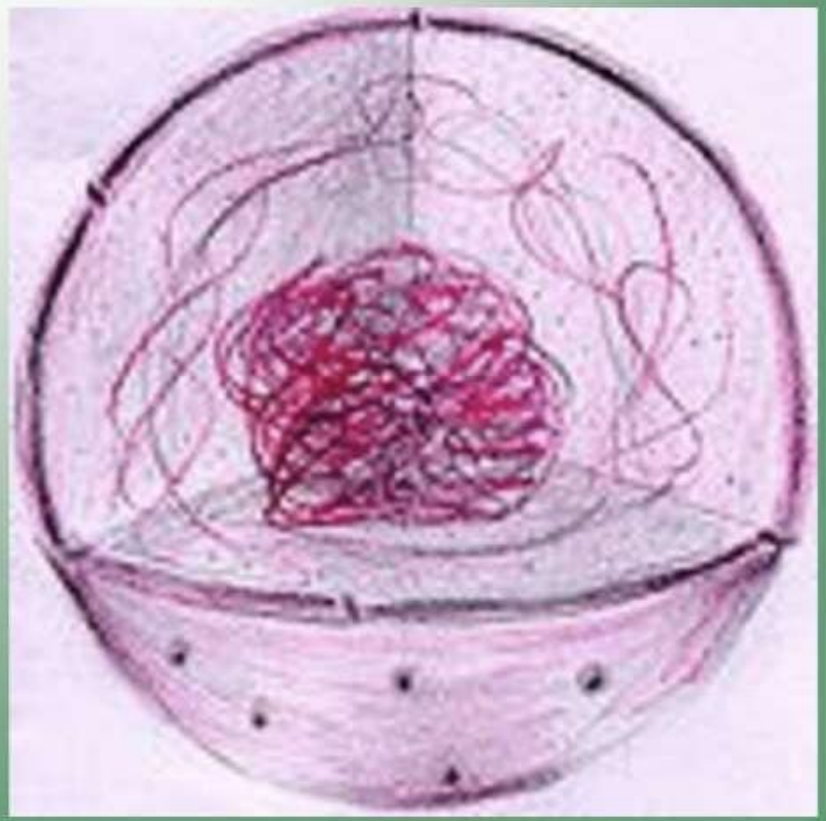
Chromosomes



- In nucleus
- Made of DNA
- Contain instructions for traits & characteristics

Nucleolus

- Inside nucleus
- Contains RNA to build proteins



Cytoplasm

- Gel-like mixture
- Surrounded by cell membrane
- Contains hereditary material

Endoplasmic Reticulum

- Moves materials around in cell
- Smooth type: lacks ribosomes
- Rough type (pictured): ribosomes embedded in surface

Ribosomes

- Each cell contains thousands
- Make proteins
- Found on ribosomes & floating throughout the cell

Mitochondria

- Produces energy through chemical reactions – breaking down fats & carbohydrates
- Controls level of water and other materials in cell
- Recycles and decomposes proteins, fats, and carbohydrates

Golgi Bodies

- Protein 'packaging plant'
- Move materials within the cell
- Move materials out of the cell

Lysosome

- Digestive 'plant' for proteins, fats, and carbohydrates
- Transports undigested material to cell membrane for removal
- Cell breaks down if lysosome explodes

Vacuoles

- Membrane-bound sacs for storage, digestion, and waste removal
- Contains water solution
- Help plants maintain shape

Chloroplast

- Usually found in plant cells
- Contains green chlorophyll
- Where photosynthesis takes place